



Australian Government

Department of Defence

LIVERPOOL MILITARY AREA HIGH VOLTAGE ELECTRICAL DISTRIBUTION UPGRADE PROJECT

Liverpool Military Area, New South Wales

Statement of Evidence
to the
Parliamentary Standing Committee
on Public Works

Canberra, Australian Capital Territory

June 2012

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Liverpool Military Area High Voltage Electrical Distribution Upgrade

Need for Works

Identified Need

1. The Liverpool Military Area (LMA) comprises both Holsworthy Barracks and the Moorebank Military Area (MMA). It is situated approximately 30km south-west of Sydney and 5km from the City of Liverpool. A Project Location Map is included at Attachment 1.
2. In the last five years a number of major projects, including the Special Operations Working Accommodation Project (SOWA) and the 171st Aviation Squadron Relocation Project, have been delivered within the LMA, resulting in an increased electrical demand. The facilities provided under the SOWA and 171st Aviation Squadron projects were initially powered by generators as demand within Holsworthy Barracks had exceeded the supply available from Endeavour Energy (formerly Integral Energy). In 2010 an increased supply was secured from Endeavour Energy, allowing for removal of the generators, but providing no spare capacity within the LMA electrical system.
3. The demand on the electrical reticulation system will increase in the future as further capital works are delivered. Planning is currently underway to deliver, subject to Government and Parliamentary approval, a number of new projects within the LMA including the Moorebank Units Relocation Project (MUR), the Defence Logistics Transformation Program Works Package 1 (DLTP) and Holsworthy Barracks Redevelopment Stage 2 Project (HBRS2). Unless the existing energy supply and redundancy issues are addressed, the LMA will continue to

experience operational difficulties and will not be able to be further developed to meet Defence's capability requirements.

4. Based on a technical design report conducted in 2011, the LMA is forecast to have a maximum demand of 28 Megavolt Amps (MVA)¹. The current maximum supply available to the LMA is 13.5MVA, which leaves a shortfall of 14.5MVA against the forecast maximum load. If this shortfall is not addressed, developments in the LMA will experience power outages and will not be able to support critical Defence capabilities.
5. The existing electrical distribution network at Holsworthy Barracks has been developed in a piecemeal manner over the last fifty years. As a result, it does not provide adequate redundancy (i.e. back up and alternative supply routes in the event of partial system failure) and is prone to failure during electrical storms. Furthermore, whilst the current connection voltage of 11 Kilovolts (kV)² is sufficient for local distribution, It is an inefficient voltage with which to transmit high loads over lengthy distances.
6. Failure to upgrade the distribution network will mean that the planned facilities will not operate effectively (if at all) and there will be a strong threat to the critical capabilities enabled by these facilities.
7. The aim of the LMA High Voltage (HV) Electrical Distribution Upgrade project, which is complemented by enabling works currently being undertaken by Endeavour Energy independently of this project, is to provide a major upgrade to the electrical supply and distribution within the LMA in order to:

¹ Electrical loads and capacities are usually measured in Megavolt Amps (MVA) which is equal to the product of the voltage and the current. One Megavolt Amp equals one million Volt Amps.

² One Kilovolt equals 1000 Volts.

- a. provide an upgraded distribution network at Holsworthy Barracks with sufficient redundancy to support the existing infrastructure as well as the planned additional facilities, and
 - b. ensure a stable and adequate electrical supply to service the growing LMA demand.
8. When completed, these works will provide the LMA with a reliable, efficient and flexible power supply and distribution system sufficient to meet the forecast demand for approximately 15 years.

Options Considered for Meeting the Need

9. In September 2011 an engineering study was conducted by the professional technical services firm AECOM Australia Pty Ltd to examine the requirements for the LMA's existing and future power supply needs. Based on that study, a number of options were examined to determine which offered the best value for money.

Distribution Options

10. The current electrical distribution system at Holsworthy Barracks is a single line main powered at 11kV. The main disadvantage of this system is the fact that any single point of failure in the system results in outages across all of Holsworthy Barracks. This represents an unacceptable level of unreliability and increases the inefficiency of the system as there is no ability to balance loads amongst different ring mains.
11. To increase the reliability and efficiency of the electrical distribution network at Holsworthy Barracks, the only feasible option was to divide the existing single line main into several discrete ring mains. These ring mains will promote greater reliability as there is no single point of failure across the entire system. In addition, the efficiency and flexibility of the system will be improved as the loads in each ring main can be balanced to ensure better use of the available electrical supply.

Connection Options

12. The LMA is currently connected to the Endeavour Energy distribution network by an 11kV connection. Within the LMA all internal ring mains are energised at 11kV. Whilst this is an acceptable voltage for local distribution networks, it is an inefficient voltage for transmission of large electrical loads over lengthy distances. To determine the best connection voltage, Defence examined the available options to improve the electrical connection of the LMA.

Connection Option One – 11kV

13. Defence examined the option of continuing to supply the base through an 11kV connection. The advantage of this option is that the base would continue to be supplied at the current connection voltage without the need to transform a higher connection voltage down to 11kV for distribution along the internal electrical system. The disadvantage of this option is that at least two additional high voltage feeder cables would need to be installed between the point of supply and the LMA as the currently installed feeder cables are incapable of carrying the forecast load. Consultation with Endeavour Energy has also revealed that an 11kV connection option will be less efficient and more expensive over the whole of life than connection at 33kV.

Connection Option Two – 33kV

14. The second connection option was to supply the base through a 33kV connection. The disadvantage of this system was that it required higher initial capital costs as transformers were required to convert the 33kV supply to 11kV. This disadvantage was outweighed by the whole of life savings that would be made, considering that transmission at 33kV is more efficient than at 11kV. In addition Defence owns a feeder cable, currently energised at 11kV, which may be used to supply Holsworthy Barracks at 33kV, doing away with any requirement to establish additional feeder cables from the point of supply to the Base.

Supply Options

15. To meet the identified high voltage power supply need, Defence has considered four options for the LMA:
 - a. Supply Option One - Supply from a proposed new Holsworthy Zone Sub-Station;
 - b. Supply Option Two - Supply direct from the high voltage transmission lines which traverse the LMA and are operated by TransGrid;
 - c. Supply Option Three - Supply from natural gas fired generators to be constructed on Defence land and operated by GridX; and
 - d. Supply Option Four - Supply from an upgraded Anzac Village Zone Sub-Station.

Supply Option One – Supply from a new Holsworthy Zone Sub-Station

16. This option considered supplying the LMA from the new Holsworthy Zone Substation (HZSS), to be built by Endeavour Energy at its own cost. The HZSS was initially planned for construction in mid-2012 but this has since been delayed until at least 2018. As a result, all facilities planned for construction in the LMA over the period 2014 to 2018 would be powered by generators until completion of the HZSS. The cost of this supply option was deemed not to offer value for money to Defence.

Supply Option Two – Supply from TransGrid Transmission Lines

17. This option investigated 'stepping down' supply from the 330 Kilovolt (kV) TransGrid owned high voltage transmission lines that traverse Holsworthy Barracks and supply Endeavour Energy. This option would supply the LMA and would include construction of a sub-station at significant cost to Defence over a period of two years. In addition, this option would require additional negotiation between Defence and TransGrid to establish agreed supply arrangements. The cost of electricity supplied under this arrangement represents less value for

money over the project's whole of life than the Endeavour Energy supply options considered.

Supply Option Three – Supply from Gas Fired Generators

18. This option investigated the construction of natural gas fired generators and associated infrastructure which would supply the energy demands of the LMA. Construction would take approximately two years and would be funded by Defence. Defence would be required to enter into a supply agreement for an initial period of 15 years. The cost of electricity generated in this manner represents less value for money over the project's whole of life than the other supply options considered.

Supply Option Four – Supply from an upgraded Anzac Village Zone Sub-Station

19. Endeavour Energy is currently upgrading the existing Anzac Village Zone Sub-Station (AVZSS) at its own cost. As a result Endeavour Energy will be able to increase the guaranteed electrical supply from the AVZSS to the LMA by early 2014. This supply will be transmitted at 33kV along an existing Defence owned high voltage cable that was installed as part of the SOWA and 171st Aviation Squadron projects. This cable currently transmits power at 11kV but has been designed to accommodate the proposed 33kV supply when it becomes available. The option to continue to supply the LMA from AVZSS at 11kV was investigated and found to offer less value for money than transmission at 33kV over the project's whole of life.

Reason for Adopting the Proposed Course of Action

20. When examining the distribution and connection options the most cost effective solution was that:
 - a. Holsworthy Barracks should be connected to the wider electrical network at 33kV, as this is more efficient than an 11kV connection; and

- b. the internal distribution system should be altered to compose several discrete ring mains, thus providing increased reliability and flexibility in comparison to the existing single line main.
21. Supply Option One was discounted from consideration as it was unable to meet the forecast energy requirements of the LMA within a suitable time period. Both Supply Option Two and Supply Option Three require significant Defence contributions toward the construction of the supply infrastructure and would reduce Defence's ability to attract discounted tariffs from Endeavour Energy. Option Four, whilst reliant on Endeavour Energy's undertaking to increase the capacity of the AVZSS by early 2014, will not require a Defence contribution to the cost of increasing the capacity of the AVZSS. Further, the infrastructure required to supply Holsworthy Barracks from the AVZSS is already established. As such, Option Four provides the most cost effective solution for Defence and is the recommended option for increasing supply to the LMA.

Historical Background

22. The LMA has been in continuous use for almost 100 years. The Department of Defence has identified Holsworthy Barracks, within the LMA, as an enduring operational base to be retained by Defence for the long term supporting Defence's Special Forces and High Readiness Reserve units.
23. Holsworthy Barracks is currently home to the Headquarters of the 5th Brigade and associated direct command units, 2nd Commando Regiment, 6th Aviation Regiment, 17th Signals Regiment, 1st Health Support Battalion, Defence Police Training Centre, 171st Aviation Squadron and the 17th Construction Squadron.
24. The MMA is currently home to 14 Defence units and four Defence facilities, of which the largest are the School of Military Engineering (SME) and the Defence National Storage and Distribution Centre (DNSDC).

25. The existing high voltage power supply to the LMA is provided by Endeavour Energy from their AVZSS located on Anzac Avenue in West Wattle Grove. A map of the existing electrical distribution system within the LMA is included at Attachment 2. The current maximum supply available to the LMA is 13.5 MVA.
26. The existing electrical distribution network at Holsworthy Barracks has developed in a piecemeal fashion over many years, with modifications and extensions occurring as additional facilities have been constructed. The system now does not provide the redundancy required by Defence, as no alternate supply routes are available in the event of a partial system failure. As the majority of the existing electrical distribution network is above ground, it is also prone to failure during storms, mainly as a result of trees and branches falling onto the power cables.
27. Table 1 details the electrical demand of current and planned major infrastructure assets within the LMA. The existing MMA load is included for reference only and is not included in the total load as it is intended that these facilities will be replaced by the DLTP and MUR Project.

Asset	Planned Delivery Date	Maximum Load (MVA)
Existing Holsworthy Barracks Load	Existing Facilities	10
<i>Existing Moorebank Military Area Load (including SME and DNSDC)³</i>	<i>Existing Facilities</i>	3.5
Defence Logistics Transformation Project (DLTP)	2013 - 2014	8
Moorebank Units Relocation Project (MUR)	2013 – 2014	5
Holsworthy Barracks Redevelopment Stage 2 Project (HBRS2)	2015 – 2018	3
Holsworthy Barracks Future Growth	2016 – 2030	2
Total		28

Table 1: LMA HV Upgrade Projected Load Requirements

³ The existing MMA Load is included for reference only as it will cease upon successful delivery of DLTP and MUR in 2014.

28. The LMA Electrical Reticulation Master Plan, approved by Defence in October 2011, identified that the existing electrical infrastructure within Holsworthy Barracks was sub-standard and nearing the end of its useful life. Performance of the distribution system is below the required standard and work is required to ensure that adequate high and low voltage reticulation is available to enable a stable and adequate electrical supply to the entire Barracks. The Master Plan recommended:
- a. an increase in the total supply capacity to the LMA;
 - b. the provision of interconnectors and ring mains within the LMA;
 - c. the construction of a new Central Emergency Power Station (CEPS); and
 - d. establishing a Power Control and Monitoring Systems (PCMS).
29. Recent works completed by Endeavour Energy at the AVZSS have increased the maximum available supply to the LMA to 13.5 MVA. This supply is divided between the MMA (4.5 MVA) and the Holsworthy Barracks area (9.0 MVA). Of the 9.0 MVA supplied to Holsworthy Barracks, only 4.5 MVA is guaranteed by Endeavour Energy, with the remainder at risk should Endeavour Energy be required to meet demand elsewhere in the network. As the current maximum demand at Holsworthy Barracks is 7.5 MVA, power shedding and blackouts will occur within Holsworthy Barracks if network problems arise that force Endeavour Energy to reduce the Holsworthy Barracks supply to 4.5 MVA.
30. The 2011 LMA Electrical Reticulation Master Plan informed the Detailed Business Case (DBC) for this project. The DBC developed the recommended option detailed previously and is in accordance with the Master Plan, with the exception of construction of the CEPS and PCMS. These two items were reassessed and subsequently excluded from the project scope as the critical facilities within Holsworthy Barracks have

been provided with Local Emergency Generators (LEG). Consequently the additional cost of a CEPS and PCMS could not be justified at this time against the limited benefit they would provide to emergency power supply within the LMA. The PCMS and CEPS will be retained in the Electrical Reticulation Master Plan to improve emergency power supply in the future as the current LEG only supply those facilities in their immediate proximity and do not offer the same flexibility.

31. The DBC identified a very high risk to the operational capability of the LMA should the proposed upgrade not proceed. In particular it would have an impact on the ability of Defence to maintain Special Forces and High Readiness Reserve capability.

Environmental and Heritage Impacts

32. During the Planning Phase for this project, a review of the works against the LMA Environmental Management Plan and the LMA Heritage Management Plan was undertaken with the Defence Regional Senior Environment and Heritage Officer. This review confirmed that the proposed works are in accordance with these plans. To mitigate any environmental and heritage impacts, this project will be managed in accordance with both of these plans as well as the Defence Environmental Management Framework. A Construction Environmental Management Plan will be prepared to articulate environmental control measures and approval conditions to be implemented during construction. The proposed works do not impact on any heritage values identified in the Commonwealth Heritage List.
33. The environmental risk related to the upgrade works has been determined as low by the Defence Regional Senior Environment Officer as the works are to be completed on existing brown field sites within existing services corridors. Design of the proposed works aims to reduce environmental impacts through the re-use of existing infrastructure, including poles and transmission cables, where possible.

34. For compliance with Defence policies, minor tree trimming (pruning, but not clearing) will be required within the existing services corridors and will be completed in consultation with the Defence Regional Senior Environment Officer. Where feasible, the new electrical distribution system is proposed to be underground to minimise power outages during storms and thus improve reliability. The project scope involves only minor construction works, which can be monitored and controlled to ensure there is minimal impact on the environment. All disturbed areas will be remediated on completion. As the environmental risk has been determined to be low, no environmental permits will be required other than the Defence Regional Environmental Clearance Certificate.

Key Legislation

35. The following legislation is relevant to this project:
- a. *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)*;
 - b. *Building and Construction Industry Improvement Act 2005 (Cwlth)*.
 - c. *Work Health and Safety Act 2011 (Cwlth)*; and
 - d. *Fair Work Act 2009 (Cwlth)*.
36. The design will comply with current versions of all relevant Defence Standards, Australian Standards, Codes and Guidelines including but not limited to the following:
- a. Building Code of Australia (BCA) 2011;
 - b. Defence Manual of Infrastructure Engineering – Electrical (MIEE);
 - c. Defence Manual of Fire Protection Engineering (MFPE); and
 - d. Defence Estate Quality Management System (DEQMS) policies and processes.

Impacts on Local Communities

37. The upgrade works to be carried out within the LMA will create construction industry work through the suppliers, contractors and sub-contractors which will last for a period of approximately 18 months. This, in turn, will assist in securing the future viability of a number of local businesses that rely on the patronage of base personnel and also those businesses that are engaged to provide services within the base.
38. All works are to be carried out within the Holsworthy Barracks precinct. There will be limited impact on the local community from the material storage and construction works as the nearest residences are approximately one kilometre from the main construction site. The works should not be visible to the local community given their location within Holsworthy Barracks.
39. At present, AVZSS operates at 100% capacity. There is no additional power available to supply any new residential, commercial or Defence facilities in the area. The power supply upgrade works to be undertaken by Endeavour Energy at the AVZSS do not form part of the LMA HV Upgrade project, but will increase available supply in the region and enable future growth.
40. The LMA High Voltage Electrical Distribution Upgrade project will adopt the same traffic management plan as the concurrent MUR project to ensure all construction traffic is consistently managed and there is minimal disruption to local residents.

Consultation with Stakeholders

41. During development of the project, consultation has occurred with Defence stakeholders and Endeavour Energy. Community consultation will be conducted to inform the local community of the proposed works.

42. The individuals and organisations listed below have or will be consulted about the project. No major issues have been raised by any of the individuals or stakeholders consulted so far. The full details of each consultation are at Attachment 3.
- a. Department of Sustainability, Environment, Water, Population and Communities;
 - b. Endeavour Energy (formerly Integral Energy);
 - c. City of Liverpool Council;
 - d. State Member for Menai (Ms Melanie Gibbons MP); and
 - e. NSW Fire Brigade.
43. The ongoing involvement of Endeavour Energy is crucial to the successful development and delivery of this project and consultation with them will continue throughout the project.
44. All works proposed under this project are to be carried out on Defence infrastructure situated entirely within the bounds of Commonwealth Land. It is therefore anticipated that there will be minimal impact on the local community either during construction or once the upgraded network is in operation.
45. Notwithstanding this, and in accordance with requirements of the Parliamentary Standing Committee on Public Works (PWC), Defence will convene a public consultation briefing on the project at the Wattle Grove Community Hall in July 2012. The outcomes of this meeting will form a supplementary submission to this Statement of Evidence to the PWC.

Purpose of the Works

Project Objective

46. The objective of this project is to upgrade the electrical supply and distribution infrastructure within the LMA to ensure a stable and adequate supply to service growing demand.

Project Description and Scope of Works

47. To meet this objective, the LMA HV Electrical Distribution Upgrade Project proposes to deliver improved electrical infrastructure within Holsworthy Barracks including:
 - a. construction of two Intake Switching Stations (ISS) that receive the electrical supply at 33 kV and house transformers to convert the supply to 11kV and relevant equipment (switchgear) to control distribution of the electrical power within the base;
 - b. construction of an 11kV interconnecting cable between the two ISS to provide redundancy within the electrical distribution system;
 - c. reconfiguration of the existing Holsworthy Barracks distribution system into seven separate ring mains to balance the load on each ring main and provide redundancy within the electrical distribution system; and
 - d. design for the future installation of a PCMS and CEPS to enable greater flexibility of electrical supply and the provision of emergency power to critical base assets.

Supporting Works - New 33 kV Electrical Supply

48. The most common electrical transmission voltages in the Sydney region are 11 kV, 33 kV and 132 kV. The current supply to the LMA is transmitted at 11kV. It is proposed that the future supply be transmitted

at 33kV, as this higher transmission voltage enables the use of smaller, more manageable cables to carry the given electrical load, reduces losses in the cables due to voltage drop, and provides Defence with the most economical supply.

49. Continuation of the LMA supply at 11kV would require the installation of at least two additional feeder cables from AVZSS to Holsworthy Barracks to meet the forecast power demand. A whole of life analysis determined that this option did not represent value for money to Defence.
50. The existing, Defence owned, supply cable is capable of supporting supply at 33kV with no upgrade works required. The new 33kV supply will be drawn from Endeavour Energy's AVZSS which is currently being upgraded by Endeavour Energy at no cost to Defence. The supply available to the LMA will be increased from the current 13.5MVA to 28MVA.

Construction of two Intake Switching Stations (ISS)

51. The proposed ISS buildings are designed to house the 33kV/11kV transformers required to step down the new incoming supply from 33kV to the distribution voltage of 11kV. The ISS provide the necessary equipment (switching gear) needed to facilitate distribution through the upgraded network (ring mains). One of the ISS is designed to be constructed with sufficient adjacent external additional space for the future installation of a CEPS and PCMS in the same location.
52. The majority of the load in the LMA is centred on Holsworthy Barracks. The two ISS will, therefore, be sited on opposite sides of the boundary of this main load area. The locations of the ISS are marked on the High Voltage Distribution System Layout Site Plan at Attachment 4.
53. The ISS will provide supply at 11kV into seven ring mains, each of which delivers power to a particular load centre. Each ring main starts at one ISS and connects to the other. The ring mains are designed to allow the

amount of supply drawn from each ISS to be varied depending on the overall load on each ISS. This will ensure a full alternate supply for any cable failure.

Construction of 11kV Interconnector between ISS1 and ISS2

54. The two ISS are proposed to be linked by an Interconnector. This is an underground 11kV cable that allows greater control of the distribution network by providing increased flexibility to re-route supply from either ISS should any part of the distribution network or one of the ISS experience problems. This will improve the reliability of the Holsworthy Barracks electrical distribution network and minimise power outages.
55. The Interconnector will be laid underground within existing service corridors and pass through the centre of the load area of Holsworthy Barracks in the most direct and practical route possible.

11 kV Distribution Upgrade at Holsworthy Barracks

56. The current distribution network around Holsworthy Barracks has evolved over time in an uncoordinated manner. This network is proposed to be rationalised into seven ring mains. To allow for future expansion and the flexibility to provide alternate supply routes to each area, the layout of these ring mains is to be designed such that each ring initially carries only 60% of its maximum capacity. This allows for future expansion as the base continues to develop.

Design for future PCMS and CEPS

57. A PCMS will allow maintenance staff at Holsworthy Barracks to monitor sub station and supply loading and carry out load shedding within the network. The CEPS will provide a central emergency power supply to be used to ensure essential facilities remain operational in the event of an emergency. It is proposed that the distribution network and both ISS are designed and constructed to enable PCMS and CEPS to be fitted at a later date with minimal additional work.

Details and Reasons for Site Selection

58. The majority of the work will be the installation of new underground and aerial cabling to integrate with the existing network and to link all functional areas of the base. Most of this cabling will be through existing designated services corridors.
59. The main building activity for the project is the two new ISS. In order to allow optimum operation of the upgraded distribution network and comply with the MIEE, the two ISS buildings are required to be located on opposite sides of the high voltage network.
60. Potential sites were identified on the eastern and western sides of Holsworthy Barracks and a Site Selection Board was convened in April 2010 to assess the proposed locations for siting the two ISS buildings. The proposed locations were approved by the Site Selection Board and the design of the electrical distribution upgrade has been progressed based on these locations.
61. The underground 11kV Interconnector will run between the two ISS and will, for the most part, be laid alongside existing cables. This will reduce disruption to the base.

Local Road and Traffic Concerns

62. The main access point into Holsworthy Barracks is from Heathcote Road, with alternate site access through the Base Rear Gate off Moorebank Avenue. All construction traffic for projects within Holsworthy Barracks is required to use the alternate site access through the Base Rear Gate. Designated parking zones will be identified for contractor parking and proposed truck routes will be established within the base, thus minimising the use of roads regularly used by the base population and visitors.

63. While traffic arising from this project will be minimal, when considered in conjunction with the likely traffic resulting from the MUR project, there will be an increase of 2000 – 3000 construction workers per day in the area. All construction traffic will be required to abide by the MUR traffic management plan.

Zoning, Local Approvals and Land Acquisition

64. The facilities proposed in the project will be constructed on Commonwealth owned and Defence controlled land, and therefore no civilian authority, zoning or development approvals are required, although the works will comply with the relevant standards and regulations. The proposed works do not require the acquisition of additional land or involve any land disposal.
65. There are no Native Title or Indigenous Land Use Agreement issues associated with this project.
66. There will be no change to the existing land use conditions for any of the project sites and all proposed land uses for the various sites are consistent with the current zone and precinct plans, where such plans exist.

Planning and Design Concepts

67. A preliminary concept layout drawing for the proposed supply and distribution system has been prepared by the Design Services Consultant (Webb Australia). Detailed design and construction drawings and specifications will be prepared for the works. All electrical services and the new ISS will be designed in accordance with user requirements, Australian Standards, the Building Code of Australia, the MIEE and the MFPE.
68. ISS1 has been designed to allow for the possible future installation of a CEPS. The building has been designed with a footprint allowing for the

CEPS and PCMS. Plan views of ISS1 and ISS2 are at Attachments 5 and 6 respectively.

69. The electrical distribution infrastructure has been designed to be sufficient to satisfy base power requirements up until 2030. This is based on load calculations conducted by AECOM Australia Pty Ltd in 2011 that included all known proposed developments and a growth factor.
70. In addition to technical reviews conducted within Defence by the Directorate of Estate Engineering Policy, consultation has been undertaken with Endeavour Energy to ensure that the proposed works comply with Endeavour Energy's requirements and standards. Defence will seek formal approval from Endeavour Energy for all design and works.

Landscaping

71. Landscaping works will be completed to restore areas disturbed during construction and provide general improvement to the built environment. As the majority of the completed works will be underground electrical cabling, once the ground has been reinstated, there will be minimal visual impact.
72. Precautions will be taken to avoid compromising environmental sensitivities by adopting landscaping practices in accordance with local environmental conditions, advice from the Base Senior Environment and Heritage Officer, and the Construction Environment Management Plan.

Energy Conservation Measures

73. The Commonwealth is committed to Ecologically Sustainable Development and the reduction of greenhouse gas emissions. The 33kV transmission voltage enables the use of smaller, more manageable cables to carry the given electrical load and provides Defence with the most economical supply. Defence reports annually to Parliament on its

energy management performance and on its progress in meeting the energy efficiency targets established by the Government as part of its commitment to improve Ecologically Sustainable Development. This project has addressed this policy by adopting cost-effective and ecologically sustainable development as a key objective in the design, development and delivery of new facilities.

Demolition and Disposal of Existing Structures

74. The project does not require the demolition or disposal of existing structures. All redundant infrastructure (cabling etc) will be removed and the area rehabilitated on completion. Materials will be removed in accordance with the relevant regulations and recycled where appropriate.

Occupational Health and Safety Measures

75. The facilities to be provided under this project will comply with Department of Defence Occupational Health and Safety Policy, the *Work Health and Safety Act 2011 (Cwlth)*, Occupational Health and Safety (Commonwealth Employment - National Standards) Regulations and the Defence Occupational Health and Safety Manual. Compliance will be checked by a Building / Works Certifier prior to acceptance of the works by Defence.
76. In accordance with Section 35(4) of the *Building and Construction Industry Improvement Act 2005 (Cwlth)*, contractors will be required to hold full occupational health and safety accreditation from the Office of the Federal Safety Commissioner under the Australian Government Building and Construction Occupational Health and Safety Accreditation Scheme. All construction sites will be appropriately secured to prevent access during the construction period. No special or unusual public safety risks have been identified.

Cost Effectiveness and Public Value

Outline of Project Costs

77. The estimated cost for this project is \$19.6 million, excluding Goods and Services Tax. The estimate includes the cost of management and design fees, construction, equipment, allowances for escalation, design and construction contingency and Defence contingency.
78. A minor increase in net operating costs is expected due to maintenance of the two new ISS. Whilst an increase in utilities expenses is anticipated due to an increase in demand, it should be noted that the cost per unit of electricity at 33kV is less than the cost at 11kV.

Details of Project Delivery System

79. A Design Services Consultant is currently engaged to complete the design package. This consultant will provide technical advice during the construction phase.
80. A Project Manager / Contract Administrator will be appointed by the Commonwealth to manage the proposed works, administer the construction Head Contract and co-ordinate the technical input from the Design Services Consultant.
81. A Head Contractor, using the Defence form of Head Contract, will be appointed to deliver procurement of trades and construction of the proposed works.

Construction Schedule

82. The project program is constrained by Endeavour Energy's program for the provision of additional 33kV supply to the AVZSS. The new 33kV supply from the East Liverpool Transmission Sub-Station to the AVZSS

is not expected to be completed until mid-2014 based on current Endeavour Energy Projections.

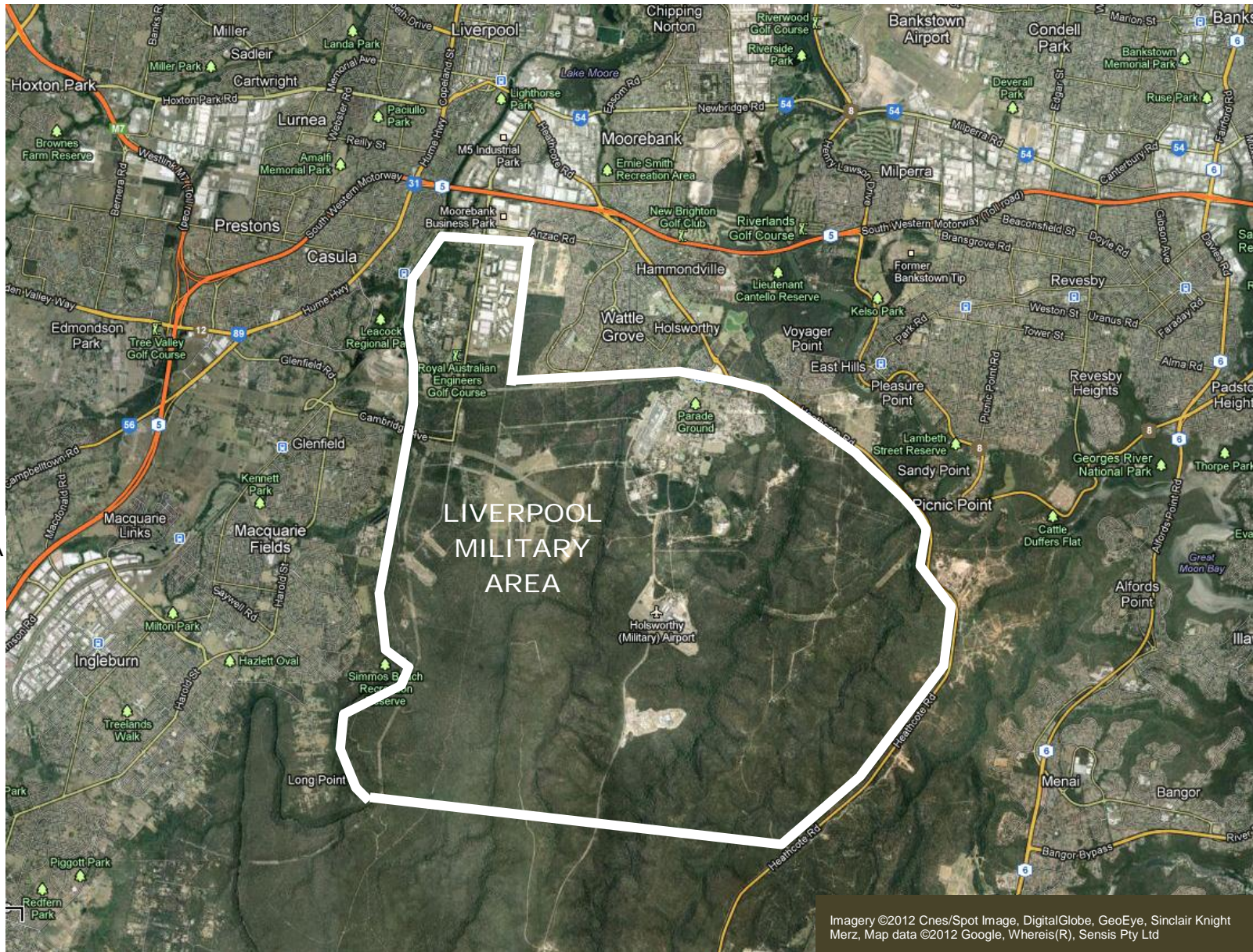
83. The construction program for the works within the LMA has been planned to finish at the same time as the upgrade works at the AVZSS in order to take advantage of the new supply as soon as it is available.
84. Subject to Parliamentary approval of the project, construction is expected to begin in January 2013 and be completed by mid 2014.

Public Value

85. By rectifying existing electrical problems and failures and ensuring effective and reliable power supply to facilities within the LMA, the proposed works will contribute significantly to Defence capability and effectiveness, which has an inherent public value.
86. Public value is also achieved by undertaking all high voltage upgrade works now to allow for future growth until 2030. An ad-hoc approach in the future to cater for growth will be more costly than addressing those future needs as part of this project. The cost of investment, both in capital and operating terms, has been optimised through taking a long term view of a major infrastructure upgrade.
87. The proposed upgrade is required to provide adequate supply for the redevelopment of Holsworthy Barracks and the relocation of Units from the Moorebank Area. Consolidation of the facilities at Holsworthy Barracks will ensure ongoing trade for local businesses in the area both on Base and supporting the Base personnel.

Revenue

88. No revenue will be derived from this proposal.

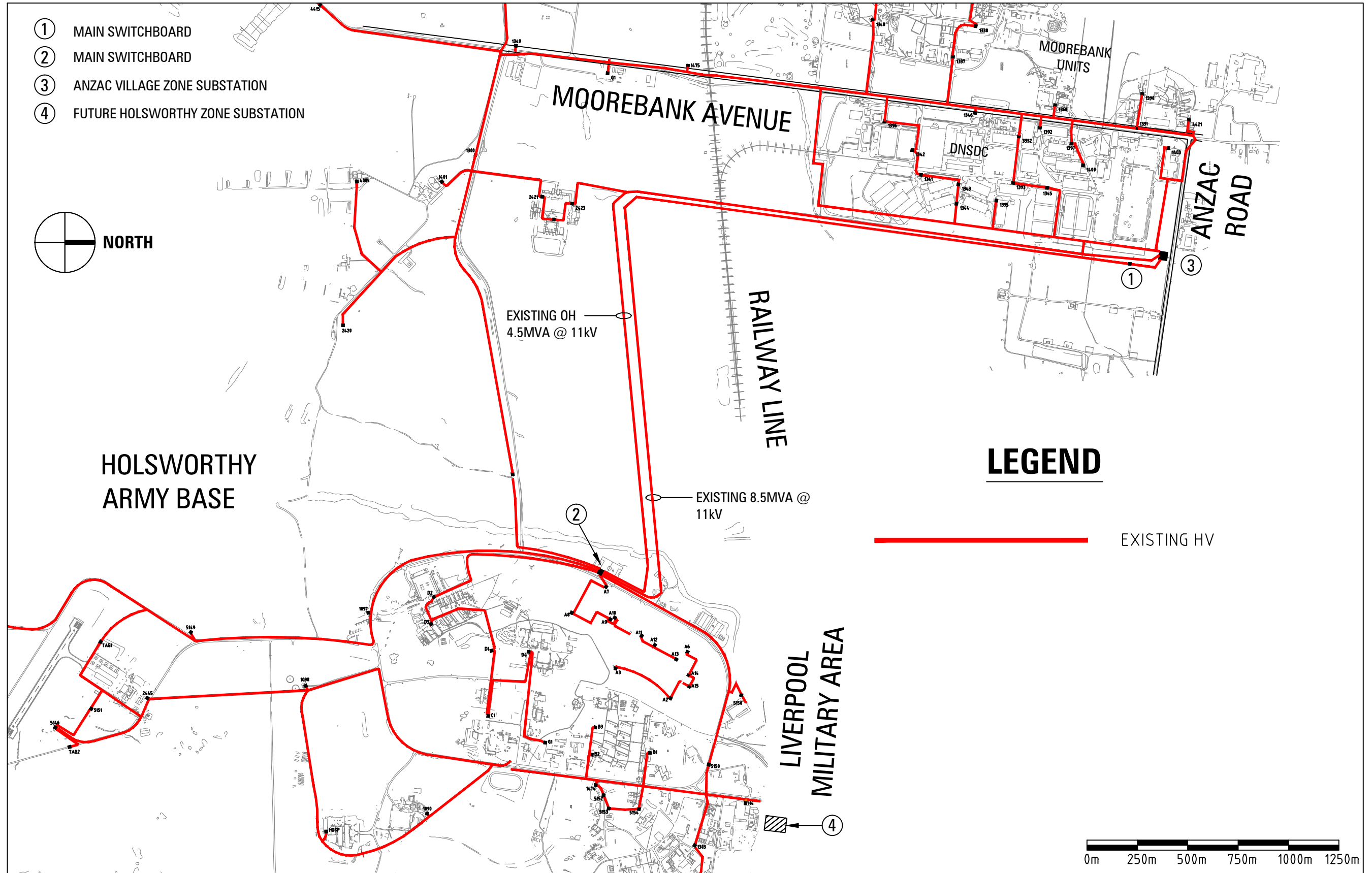


CANBERRA
250KM

SYDNEY
250KM

**LIVERPOOL MILITARY AREA – HIGH VOLTAGE DISTRIBUTION UPGRADE
PROJECT LOCATION MAP**

Imagery ©2012 Cnes/Spot Image, DigitalGlobe, GeoEye, Sinclair Knight Merz, Map data ©2012 Google, Whereis(R), Sensis Pty Ltd



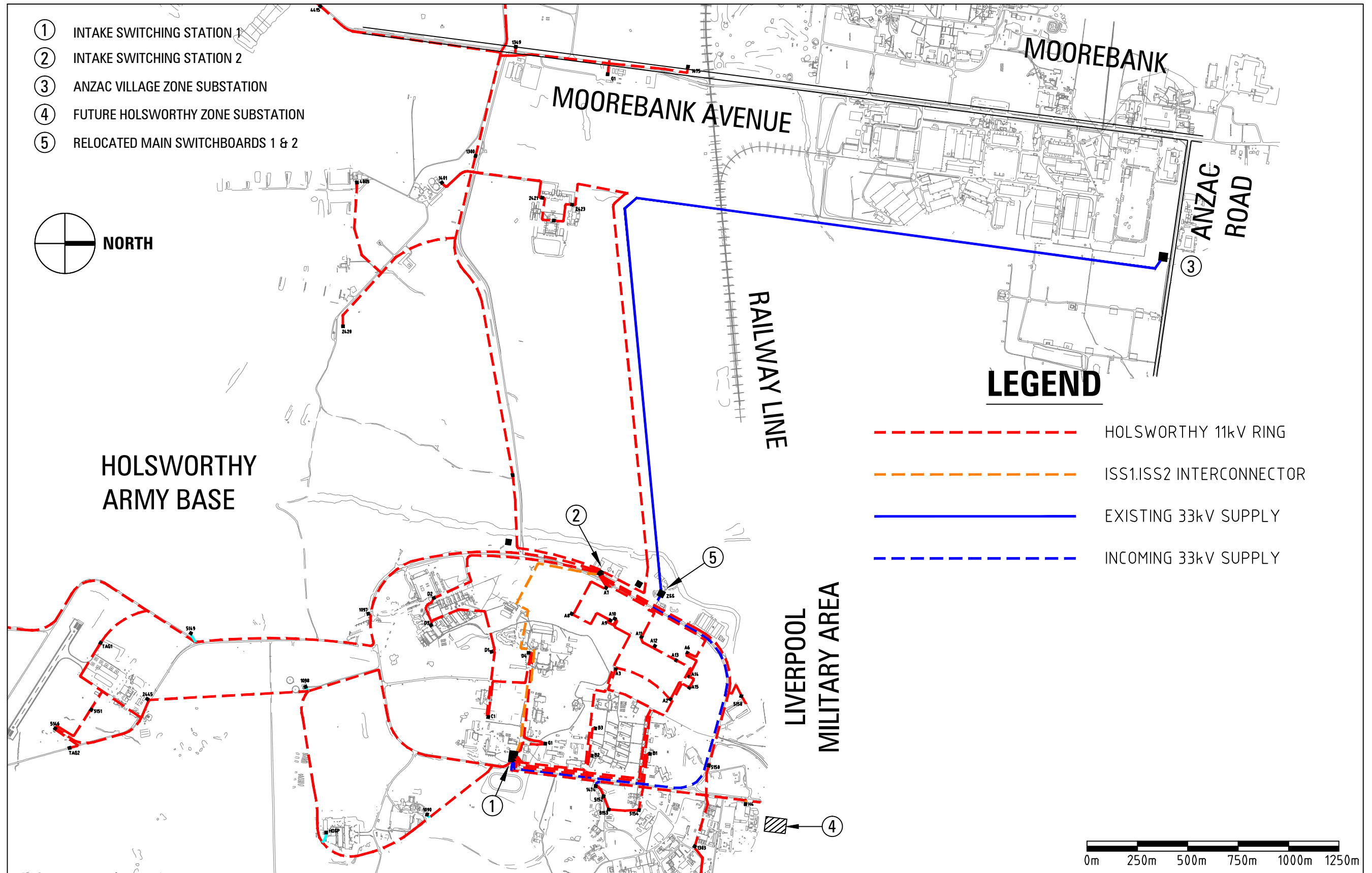
EXISTING HIGH VOLTAGE DISTRIBUTION SYSTEM WITHIN THE LMA

ATTACHMENT 3

Record of Stakeholder Consultation

Stakeholder	Consultation	Date
Department of Sustainability, Environment, Water, Population and Communities	PWC Public Consultation*	July 2012
	PWC Hearing	August 2012
Endeavour Energy (formerly Integral Energy)	Ongoing	Project Duration
	Initial discussions with Integral Energy	February 2007
	Correspondence confirming intent to connect a new 70MVA (33KV) feed to AVZSS	September / October 2011
City of Liverpool Council	PWC Public Consultation*	July 2012
	PWC Hearing	August 2012
State Member for Menai (Ms Melanie Gibbons MP)	PWC Public Consultation*	July 2012
	PWC Hearing	August 2012
NSW Fire Brigade	PWC Public Consultation*	July 2012
	PWC Hearing	August 2012

Note: *Correspondence containing project details to be sent to Stakeholders prior to Public Consultation

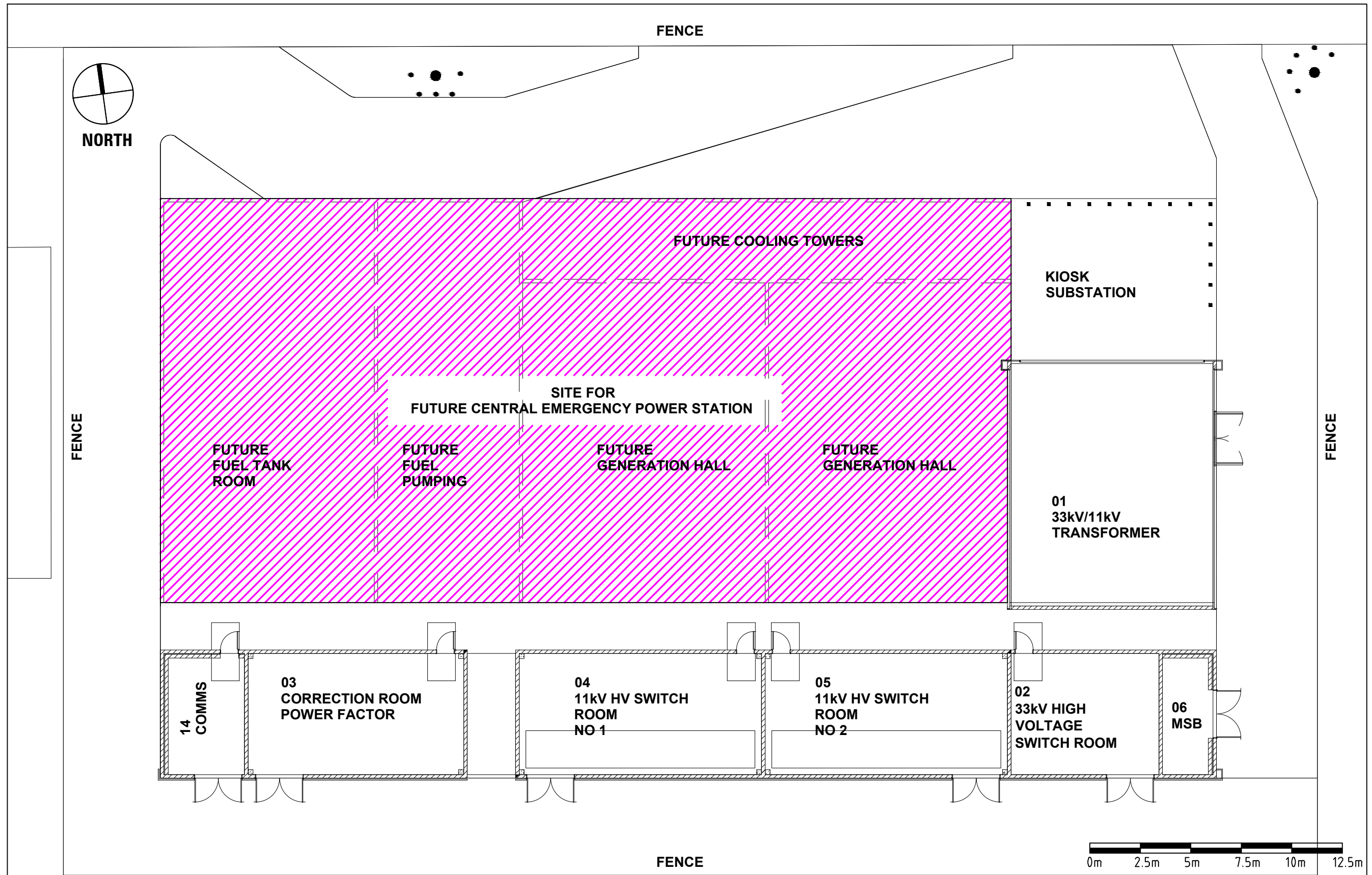


PROPOSED HIGH VOLTAGE DISTRIBUTION SYSTEM LAYOUT - SITE PLAN

WEBB AUSTRALIA GROUP (NSW) PTY LIMITED
 ABN 48 050 056 712
 LEVEL 4, 829 PACIFIC HIGHWAY, GORDON NSW 2072 AUSTRALIA
 TELEPHONE: 02 9418 1444
 FACSIMILE: 02 9418 1191
 EMAIL: info@webb-australia.com.au
 www.webb-australia.com.au



CONSULTING ELECTRICAL ENGINEERS LIGHTING CONSULTANTS TECHNOLOGY CONSULTANTS

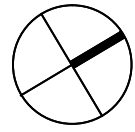


INTAKE SWITCHING STATION 1 - PLAN VIEW

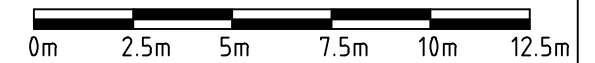
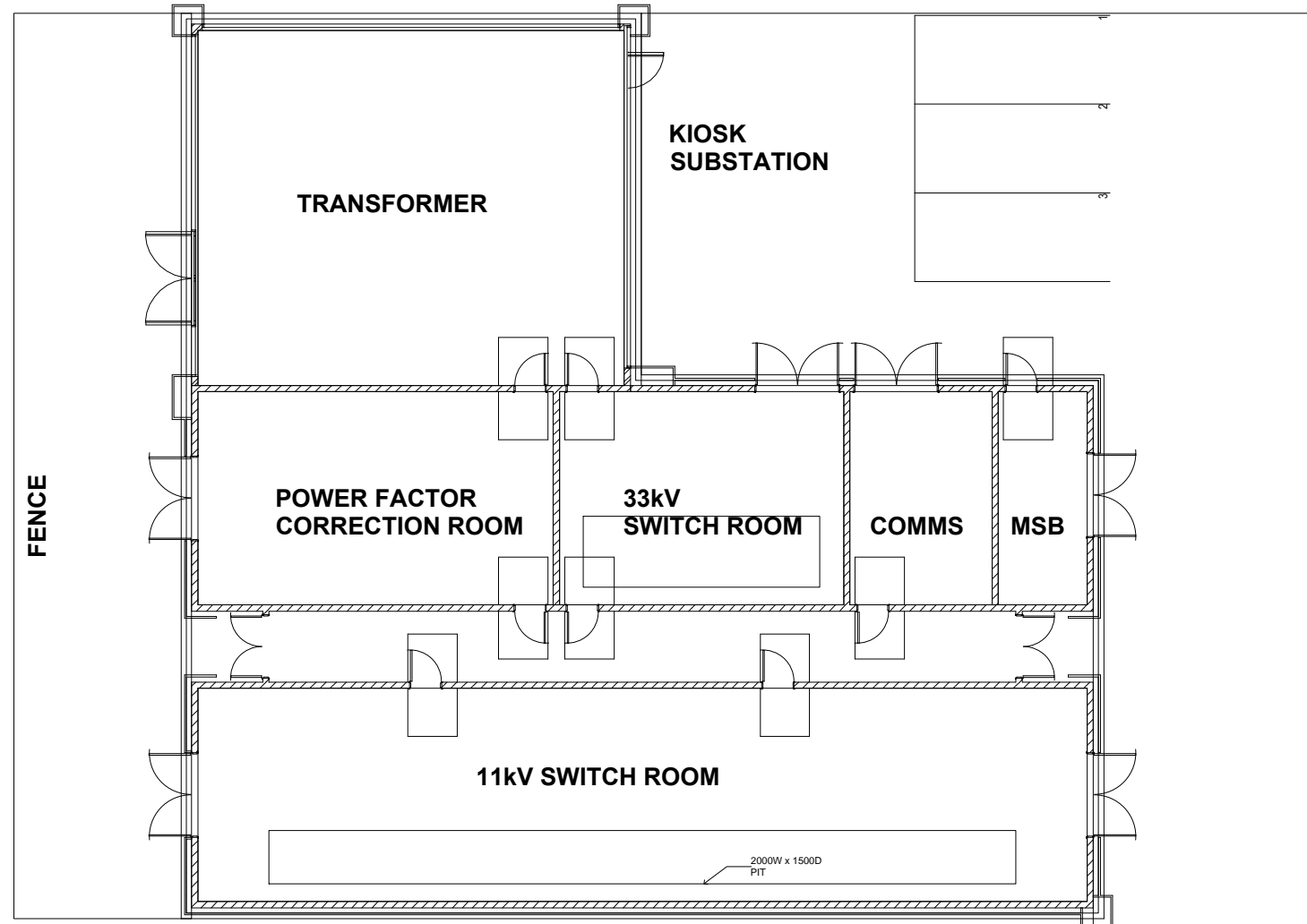
WEBB AUSTRALIA GROUP (NSW) PTY LIMITED
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NORTH



INTAKE SWITCHING STATION 2 - PLAN VIEW

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